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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/713,355	11/17/2003	Munehiro Tabata	040356-0496	9164

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FOLEY AND LARDNER
SUITE 500
3000 K STREET NW
WASHINGTON, DC 20007

EXAMINER	
NGUYEN, TU MINH	
ART UNIT	**PAPER NUMBER**
3748	

DATE MAILED: 08/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/713,355	TABATA ET AL.	
	Examiner	Art Unit	
	Tu M. Nguyen	3748	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 August 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9 and 11-13* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9 and 11-13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *17 November 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. An Applicant's Request for Continued Examination (RCE) and an Applicant's Amendment filed on August 5, 2005 has been entered. Claim 10 has been canceled; and claims 1, 12, and 13 have been amended. Overall, claims 1-9 and 11-13 are pending in this application.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office Action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1, 2, 5-9, and 11-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi et al. (European Patent Application EP 1,174,600 A2) in view of Hirota et al. (U.S. Patent 5,974,791) and Russell (U.S. Patent 6,237,326).

Re claims 1, 12, and 13, as shown in Figures 1 and 4-7, Kobayashi et al. disclose a purification device for an exhaust gas of a diesel engine and a method for controlling said purification device, the device comprising:

- a catalyst (17) which traps nitrogen oxides in the exhaust gas but decreases a nitrogen oxides trapping performance when poisoned by sulfur oxides in the exhaust gas, the sulfur

oxides poisoning the catalyst being eliminated by contact with an exhaust gas corresponding to a rich air-fuel ratio;

- a filter (18) which traps particulate matter in the exhaust gas and burns a trapped particulate matter by contact with an exhaust gas corresponding to a lean air-fuel ratio;

- an air-fuel ratio regulating mechanism (8, 9, 10) which varies an exhaust gas composition of the engine between a composition corresponding to the lean air-fuel ratio and a composition corresponding to the rich air-fuel ratio;

- a sensor (120, 130) which detects a particulate matter trap amount of the filter; and

- a programmable controller (9) programmed to:

- control the air-fuel ratio regulating mechanism to cause the exhaust gas composition of the engine to be in a state corresponding to the rich air-fuel ratio (step S401 with YES answer, step S405 with YES answer, and step S407);

- determine whether or not the particulate matter trap amount has reached a predetermined amount while the exhaust gas composition is in a state corresponding to the rich air-fuel ratio (step S402 and Figure 5);

- control the mechanism to cause the exhaust gas composition to be in a state corresponding to a high temperature (step S406), when the particulate matter trap amount has reached the predetermined amount during a period when the exhaust gas composition is in a state corresponding to the rich air-fuel ratio (step S405 with NO answer and step S406) ;

- determine whether or not the particulate matter trap amount has reached a predetermined decrease state during a period when the exhaust gas composition is in the state corresponding to a high temperature (step S405); and

- control the mechanism to cause the exhaust gas composition to be in a state corresponding to the rich air-fuel ratio, when the particulate matter trap amount has reached the predetermined decrease state during the period when the exhaust gas composition is in the state corresponding to a high temperature (step S405 with YES answer and step S407).

Kobayashi et al., however, fail to disclose that during the regeneration of the filter in step S406, the exhaust gas composition is in a state corresponding to a lean air-fuel ration; and that the predetermined decrease state corresponds to a particulate matter trap amount smaller than the predetermined amount and larger than zero.

As shown in Figures 1-2, Hirota et al. teach an exhaust gas purification device comprising a DPF (10a) that is adapted to trap particulate matter, NOx, and SOx in the exhaust gas. Hirota et al. further teach that when it is time to purge particulate matter from the DPF (step 213 with YES answer), a lean exhaust gas composition at the DPF is required (step 215). It would have been obvious to one having ordinary skill in the art at the time of the invention was made, to have utilized the teaching taught by Hirota et al. in the device of Kobayashi et al., since the use thereof would have been routinely practiced by those with ordinary skill in the art.

As illustrated in Figures 1 and 7, Russell teaches an engine control system with lean catalyst and particulate filter, in which a regeneration of the particulate filter (95) is terminated when a particulate matter trap amount (spa) is smaller than a predetermined amount (S4) but is larger than zero in order to prevent the exhaust gas temperature from becoming too high to cause thermal degradation to the lean catalyst (97) (lines 36-44 of column 6). It would have been obvious to one having ordinary skill in the art at the time of the invention was made, to have

utilized the teaching taught by Russell in the device of Kobayashi et al., since the use thereof would have reduced thermal degradation to the catalyst due to the regeneration of the filter.

Re claim 2, in the modified device of Kobayashi et al., the sensor comprises a sensor (120, 130) which detects a differential pressure between an inlet and an outlet of the filter.

Re claim 5, in the modified device of Kobayashi et al., the air-fuel ratio regulating mechanism comprises an intake throttle (8) which regulates an intake air amount of the engine.

Re claim 6, in the modified device of Kobayashi et al., the air -fuel ratio regulating mechanism comprises a fuel injector (10) which injects fuel into the exhaust gas of the engine.

Re claim 7, in the modified device of Kobayashi et al., the engine comprises an exhaust gas recirculation passage (23) which recirculates part of the exhaust gas into an intake air according to an exhaust gas pressure of the engine, and the air-fuel ratio regulating mechanism comprises an exhaust throttle (25) which regulates the exhaust gas pressure.

Re claim 8, in the modified device of Kobayashi et al., the engine comprises a fuel injector (19) which supplies fuel for combustion, and the air-fuel ratio regulating mechanism comprises the fuel injector set to perform a post-injection after fuel is supplied for combustion.

Re claim 9, in the modified device of Kobayashi et al., the controller is further programmed to determine that, when the exhaust gas composition of the engine has continued to be in the state corresponding to the lean air-fuel ratio for a predetermined time, the particulate matter trap amount has reached the predetermined decrease state (steps S405-S406).

Re claim 11, in the modified device of Kobayashi et al., the predetermined decrease state corresponds to a differential pressure when the controller started to control the air-fuel ratio

regulating mechanism for the first time to cause the exhaust gas composition of the engine to be in the state corresponding to the rich air-fuel ratio.

4. Claims 3-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi et al. in view of Hirota et al. and Russell as applied to claim 1 above, and further in view of legal precedent.

The modified device of Kobayashi et al. discloses the invention as cited above, however, fails to disclose that the state of the exhaust gas composition corresponding to the rich air-fuel ratio, corresponds to an exhaust gas produced by combustion of an air-fuel mixture wherein an excess air factor is within the range 0.95 to 1.0; and that the state of the exhaust gas composition corresponding to the lean air-fuel ratio, corresponds to an exhaust gas produced by combustion of an air-fuel mixture wherein an excess air factor is within the range 1.05 to 1.1.

Kobayashi et al. disclose the claimed invention except for specifying an optimum range of excess air factor of 0.95 to 1.0 and 1.05 to 1.1 for the rich air-fuel ratio condition and the lean air-fuel ratio condition, respectively. It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide a specific optimum range of excess air factor for each of the rich air-fuel ratio and the lean air-fuel ratio condition, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

Response to Arguments

5. Applicant's arguments with respect to the references applied in the previous Office Action have been considered but are moot in view of the new ground(s) of rejection.

Communication

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Tu Nguyen whose telephone number is (571) 272-4862.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Thomas E. Denion, can be reached on (571) 272-4859. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Tu M. Nguyen

TMN

August 18, 2005

Tu M. Nguyen

Primary Examiner

Art Unit 3748